

Demonstration of Armored Vehicle Technology



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This project is a demonstration of technology to rapidly and effectively armor soft-skinned tactical vehicles to provide a high level of protection from threats currently seen by U. S. military forces and allies in the Middle East. With the addition of sufficient weaponry, these “up-armored” vehicles become “gun trucks” and can fulfill desperately needed roles for convoy escort and perimeter protection.

Project Goals

The goal is to construct and field armor kits for construction of gun trucks using tactical vehicles having a cargo capacity of 5 tons or greater. The primary vehicles of interest are the FMTV, the M939 series, and the USMC MTRV trucks.



Figure 1. U. S. Army 5-ton FMTV gun truck as it was displayed at the Pentagon on June 4, 2004.

Relevance to LLNL Mission

This project is an example of the Laboratory’s meeting a critical national mission during wartime. The work draws on the Laboratory’s technical expertise in armor materials and mechanical engineering to rapidly construct and field an effective armor kit for soft-skinned military vehicles.

FY2004 Accomplishments and Results

A gun truck requires armor for the truck cab and a “pillbox” for the bed. The armored box is typically equipped with three to four crew-served weapons, such as 0.50 caliber machine guns, to provide a high level of firepower to repel an ambush. Our first prototype gun truck box was tested for both ballistic and road performance at the U. S. Army Aberdeen Test Center (ATC). The armor consists of spaced armor steel and ballistic fiberglass panels. Sections of the armor were also tested at the ATC ballistics range and were shown to be effective in stopping all known indirect and direct fire threats.

In June, the gun truck (without the cab armor) was displayed at the Pentagon for high-ranking officials. This version of the gun truck was built on the U. S. Army FMTV truck, as shown in Fig. 1. Although the design borrows much if its attributes from the Vietnam versions of gun truck, we have additional features such as bolted construction, ballistic fiberglass shrapnel/spall shields, and ballistic windows.

We then built a gun truck from the older M939 trucks for the following reasons: 1) there are more M939 trucks than FMTV vehicles currently in the theater;

2) the M939 truck is capable of handling 10 tons on-road, while the FMTV is rated for only 5 tons either on- or off-road; and 3) the cab of the M939 is much easier to armor. We worked with the USMC to modify a cab armor that they had already produced for the M939 series trucks, and built a cab armor kit in just one week. This first Livermore gun truck started running convoy escort missions on July 17. A photo of the truck leaving Camp Anaconda is shown in Fig. 2. Since that time, the gun truck has been escorting convoys at least three times a week. Feedback from the Army has been very positive, and 28 more LLNL gun truck kits have been requested.

We have also produced a second gun truck kit for the Marines' MTRV. The armored box is similar to the one developed for the U. S. Army, but the hardware to mount the box to the truck box and the cab armor are modified for this vehicle. The MTRV gun truck (Fig. 3) was assembled and demonstrated for the Marines at Camp Pendleton. It is currently undergoing road testing at ATC.

FY2005 Proposed Work

We will continue our efforts in vehicle armor technology with funding from DARPA. This follow-on effort will include producing 30 kits for gun trucks; further refinement for the USMC MTRV; and new, weight-efficient armor materials and structures for both vehicle and personnel protection.



Figure 2. An M939 series gun truck leaving Camp Anaconda, Balad, for its first convoy escort mission with the U. S. Army 7th Transportation Battalion.



Figure 3. The USMC MTRV gun truck at ATC.